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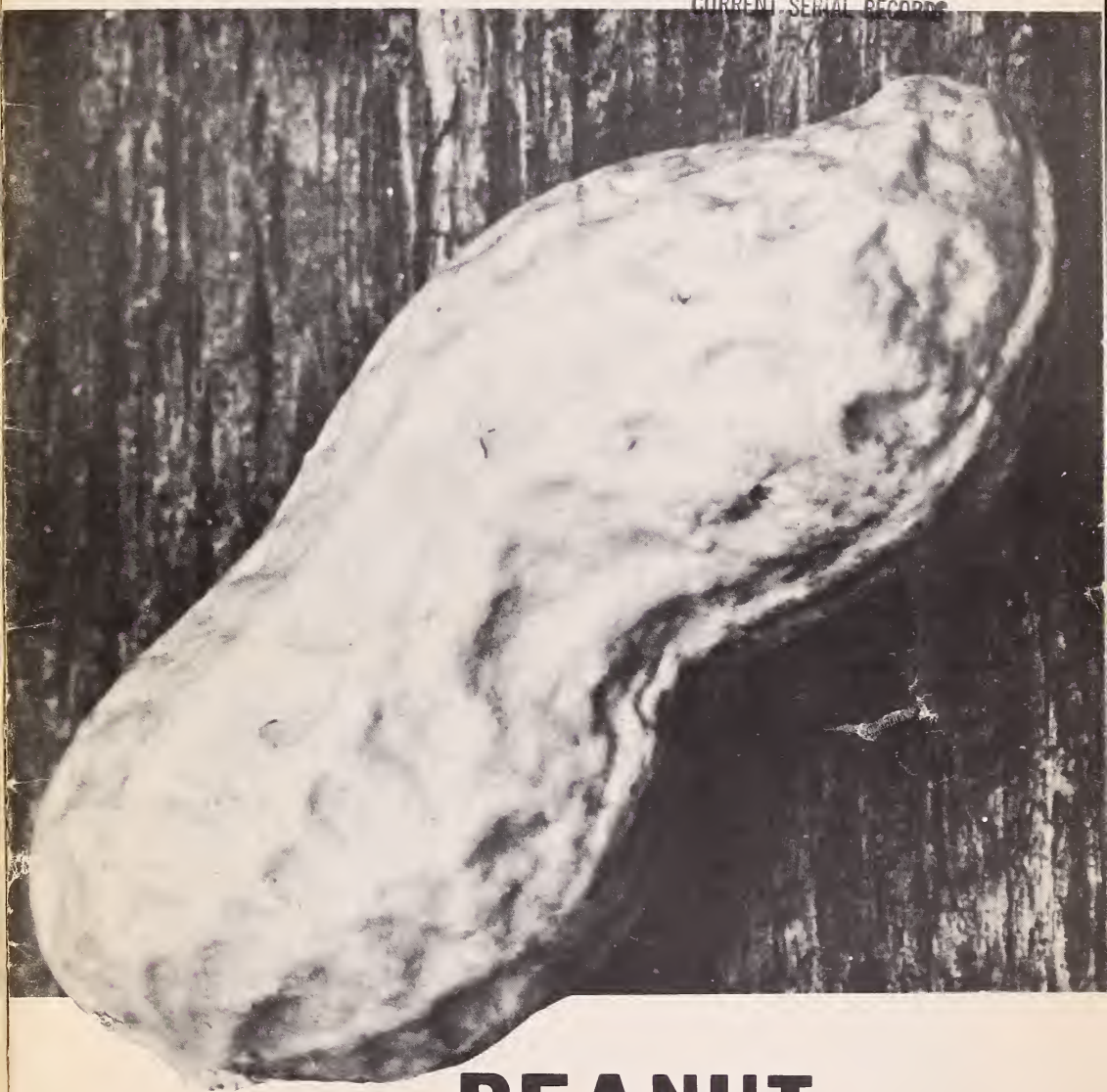

PEANUT MARKETING

U.S. DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
Fruit and Vegetable Division

CONTENTS

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PEANUT MARKETING

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Peanuts are one of the important crops of the world. They are grown in the warmer parts of all six continents, and are an important food item in these areas. In addition to local trade, there is considerable world trade in peanuts because of the European demand for peanut oil. The principal peanut-exporting areas are the former French West African countries, Nigeria, Sudan, Gambia, India, and China.

Peanuts were first discovered by Europeans in Brazil in the 16th century. They were carried by early slave ships to Africa, and from there peanuts were brought to this country along with the slaves in colonial days.

Peanuts were long thought to be native to Brazil only, but in 1936 a U.S. Department of Agriculture plant explorer, William A. Archer, found them growing extensively in the southern part of Paraguay, throughout Uruguay, and in the northeastern part of Argentina. Dr. Archer found several strains grown by the Indians closely related to our cultivated peanuts.

Whether peanuts were grown within the present limits of the United States by the Indians in pre-Columbian times is still uncertain, but we do know they were grown during the colonial days. "Ground nuts," a term still used in practically all countries other than the United States, are mentioned in some of our earliest colonial records (though this name was used for other plants as well as peanuts, and we are not always sure what plant was indicated).

The following quotation from a report given by Sir William Watson before the Royal Society and published in the Philosophical Transactions for October 1769 is of special interest:

> It is with this view, that I lay before you some parts of a vegetable and the oil pressed from them. They were sent from Edenton, North Carolina, by George Brownrigg, whose brother, Dr. Brownrigg, is a worthy member of our society; and are the produce of a plant well known and much cultivated in the southern colonies and in our American sugar islands, where they are called groundnuts, or ground pease . . . Mr. Brownrigg, from whom, as I before mentioned, I received the oil, considers the expressing oil from the ground pease as a discovery of his own. It may, perhaps, at this time, be very little practiced either in North Carolina, the place of his residence, or elsewhere. But certain it is that this oil was expressed about four score years ago; as Sir Hans Sloane mentions it, in the first volume of his History of Jamaica; and says that this oil is as good as that of almonds . . . After the oil has been expressed from the ground pease, they are yet excellent food for swine.

Thomas Jefferson mentioned that peanuts were grown in Virginia, but he implied that the crop was of little commercial importance. Prior to the Civil War, peanuts were grown commercially for local consumption throughout the South and in California. Ramsey, in his history of South Carolina, 1809, mentioned ground nuts used as a food, as a substitute for cocoa, and as a source of oil for domestic use. The fact that they were being grown commercially in South Carolina, is shown also from records of exports at the Port of Charleston.

Several others writing from Georgia, Alabama, Mississippi, Louisiana, and California, at about the middle of the 19th century, spoke of peanuts as a valuable crop, especially for hog feed.

In 1851, W. C. Easby of Vernon, Tennessee, wrote: "The gooberpea is extensively raised here, and so far has proved the most profitable crop that can be raised. The first ever raised for market was sold in Nashville in the fall of 1845. Since that time there has been upwards of 20,000 to 25,000 bushels raised within a 10- to 15-mile radius of this place each year, and sell for 65 cents to one dollar for 22 pounds. The vine is equal to clover hay for stock, if well saved."

During and immediately after the Civil War, commercial production of peanuts increased rapidly. Then most of the commercial crop was roasted in the shell and sold freshly roasted by street vendors. The work of harvesting, picking, and preparing for market was all done by hand or with crude homemade equipment. There were no commercial shellers, and lack of uniformity and poor quality hindered trade in peanuts, especially for roasting.

The first factory for cleaning, grading, and polishing peanuts for roasting in the shell reportedly was built about 1880 in the neighborhood of Smithfield, Virginia. About the same time, another factory was built in New York City, probably for cleaning imported stock.

The greatest factor which contributed to the expansion of the American peanut industry was the invention around 1900 of equipment for planting, cultivating, harvesting and picking the nuts from the plants, and for shelling and cleaning the kernels. The mechanical sheller, especially, made possible the rapid increase in the use of peanuts and peanut products such as peanut oil, roasted and salted peanuts, peanut butter, peanut candy, and other confections.

While the South American Indians apparently made a peanut paste similar to peanut butter, it was not until 1890 that peanut butter was first made commercially. It was produced by a physician in St. Louis, Missouri, as a food for invalids. Peanut butter rapidly became popular and at present more than half the peanuts shelled for the edible trade in the United States are used in the production of peanut butter.

The per capita consumption of peanuts for food has increased about one-third since just before World War II, and now amounts to around 5 pounds per person. Some of this increase can be attributed to the extensive use of peanuts and peanut butter by the armed forces during the war period and to the distribution of peanut butter through the National School Lunch Program in the years since the war. An intensive advertising campaign stressing the value of peanuts as a low-cost, high-protein food also has helped increase consumption. Considerable research is being directed toward improving the quality of peanuts and peanut butter, and there are indications that consumption will continue to increase.

Three main peanut producing areas are generally recognized, the division into these areas being based largely on the type of peanut grown: The Virginia-Carolina area, producing chiefly the Virginia type, includes the States of Virginia, North Carolina, that part of South Carolina north and east of the Santee-Congaree-Board Rivers, Tennessee, and Missouri; the Southeastern area, producing Runner, Spanish, and Virginia types, includes the States of Georgia, Alabama, Florida, Mississippi, and that part of South Carolina south and west of the Santee-Congaree-Board

TABLE 1. *U.S. production of peanuts picked and threshed (farmers' stock basis), 5 year averages, 1931–1960, by principal production areas*

Year	Southeast area	Virginia-Carolina area	Southwest area	U.S. total
	Tons	*Tons*	*Tons*	*Tons*
1931–35	247,013	195,866	55,502	498,381
1936–40	361,079	235,085	79,958	676,121
1941–45	553,347	245,902	197,515	996,784
1946–50	554,255	247,943	243,364	1,045,560
1951–55	351,398	241,130	122,041	714,568
1956–60	404,666	267,725	150,741	823,132

Source: Annual crop reports, Statistical Reporting Service, USDA.

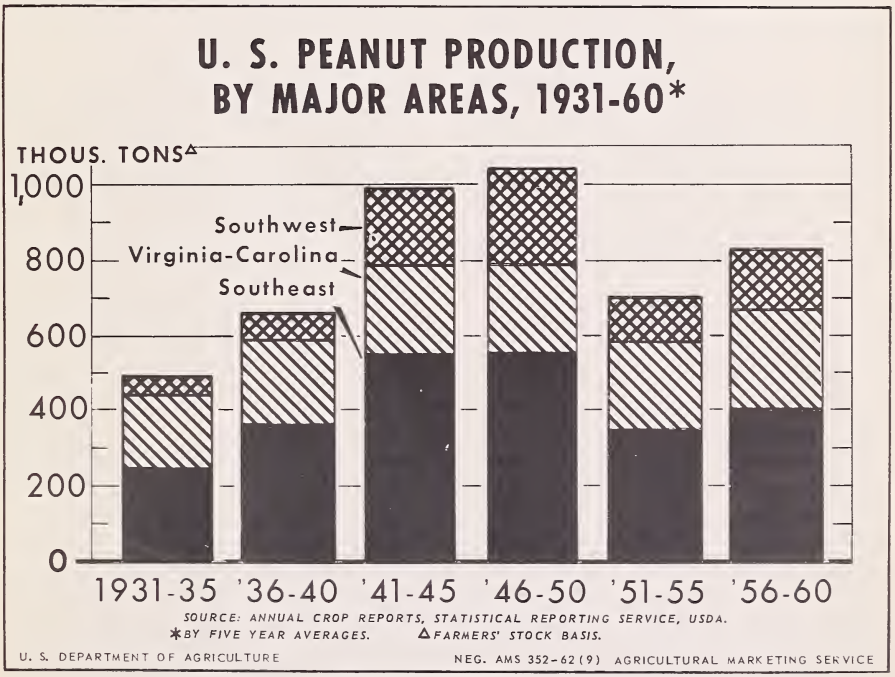

FIGURE 1.—*Chart—U.S. Peanut Production.*

Rivers; and the Southwestern area, producing chiefly the Spanish type, includes the States of Texas, Oklahoma, Louisiana, Arkansas, New Mexico, Arizona, and California.

U.S. production of peanuts picked and threshed has increased substantially in the past 30 years, as shown in Table 1. (Fig. 1.) From about 500,000 tons (farmers' stock basis) in the early 1930's, annual production increased to over 1 million tons during World War II and the years immediately following. With acreage allotments and marketing quotas becoming effective with the 1949 crop, production declined and in recent years has ranged between 800,000 and 900,000 tons annually.

Throughout this period, roughly half the total production has been in the Southeast area. From about 250,000 tons annually in the early 1930's, production increased to over 550,000 tons in the war and postwar years, and for the past several years has averaged about 400,000 tons.

The Southwest area has shown a substantially greater increase in production during this 30-year period than either of the other two areas. From a low of only a little over 50,000-ton average in the first part of the 1930's, production increased five-fold to a peak during and just after the war. For the past several years, the crop has averaged about 150,000 tons, although due to the effects of weather there are greater year-to-year fluctuations than in the other areas.

Production has increased least in the Virginia-Carolina area. Average annual production for 1931–35 was slightly below 200,000 tons. The average of the war and immediate post-war years was about 250,000 tons. After a slight dip in the early 1950's production for the most recent 5-year period averaged over 260,000 tons.

The price of peanuts has been supported to growers under programs of the U.S. Department of Agriculture since 1934, authorized by the Congress. To be eligible for support, a grower must not exceed the acreage allotment for his farm. Since acreage allotments have been in effect during most of these years, there has been relative stability in the acreage planted to peanuts, except during and immediately following World War II, when allotments were suspended in order to encourage production for oil use. Since 1949, acreage allotments again have been in effect.

Over the past 30 years, there has been a significant upward trend in yields per acre of peanuts, reflecting increased use of fertilizer, herbicides, and pesticides, shifts to higher-yielding varieties, and growth of more plants per acre by closer plantings and closer rows. Year-to-year fluctuations in yields and in production are largely due to weather conditions, such as droughts during the growing period, hurricanes or sustained rains during harvesting and curing, and untimely frosts.

TYPES AND VARIETIES OF PEANUTS

The most important types of peanuts grown in the United States are Runners, Spanish, Virginias, and Valencias.

Virginia. The Virginia - type varieties are large-podded usually containing two seeds which are relatively large and covered with a light reddish skin. There are several variety groups of the Virginia type, all of which lose their identity when they reach the mill and become known merely as Virginias. The Virginia-type varieties are grown mainly in southeastern Virginia and northeastern North Carolina, and, to a lesser extent, in Georgia, and a few other locations where conditions are suitable.

Runner. The Runner varieties are typically two-seeded. The pods may be cylindrical, with little constriction between the seeds. The skin covering the kernel is a light reddish brown. They are grown commercially in Alabama, Georgia and Florida. There are several variety groups, commonly known as Dixie Runner, Alabama Runner, Georgia Runner, Carolina Runner, Wilmington Runner, or merely Runner.

Spanish. The Spanish - type peanuts are generally two-seeded, small and usually constricted between the seeds. The kernels are small and almost round. The skin covering the kernels is a pinkish

tan, later turning to a light tan. Spanish-type peanuts are the most widely-distributed type, grown chiefly in the Southeast and Southwest.

Valencia. The Valencia-type is mostly three-seeded and smooth, with no constriction of the pods. The kernels are very large. It is the most important of the unclassified varieties and is grown chiefly in New Mexico.

HARVESTING

The Spanish-type varieties mature about 120 days after planting, while Virginia-type varieties require from 130 to 140 days and Runner - type peanuts require about 140 days or more.

The timing of the peanut harvest is critical, since it can greatly affect the yields. If the peanuts are harvested too early many of the pods will be immature, with shriveled kernels; if the harvesting is too late, many of the pods may be lost. The grower has to choose the time when the largest number of pods will be in prime condition.

As harvest time approaches, peanuts are inspected every day or two to determine the right date for digging. The type, variety and date of planting are rough guides, but the best way to judge their maturity is to examine some of the pods themselves. If the majority of the kernels are fully developed and taking on their mature color, and the insides of the shells have begun to color and show darkened veins, the crop is ready to harvest.

Peanuts are best harvested during clear weather when the soil is dry enough so it will not stick to the stems and pods. Bright, clean pods are worth more than dusty and discolored ones. If the soil is very dry and crusted,

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FIGURE 2.—*Peanut digger in operation.*

N 42600

FIGURE 3.—*Combine-pickers in operation in the Southeast. The peanuts are elevated to the hoppers. When the hoppers are full, they are dumped into a truck for delivery to an artificial drying plant or to a cleaner and sheller.*

however, many of the pods may break off and be lost.

Good weather is also important in processing good quality peanut hay, a by-product used for livestock feed. Clean, dust-free peanut hay is more valuable.

In southern Texas, harvesting usually begins by mid-July, and extends into early August. In northern Texas and Oklahoma, harvesting may begin in the middle of September and extend into November. Harvesting in the Southeast may extend from July to October. In the Virginia-North Carolina section, harvesting usually begins in late September or early October and extends for a month or more.

DIGGING

Peanut diggers are fitted with sharpened plates that slide along below the surface, cutting the main root and loosening the plant from the soil. This leaves most of the root system and nitrogen nodules in the soil. Then the diggers lift the plants, shake off loose dirt, and deposit them on the surface with the peanuts next to the soil, protected from the sun and dew. (Fig. 2.)

DRYING

Drying, or curing, is one of the most important operations in peanut culture. Every care must be taken, because much of the value of a fine crop can be lost during this critical period. When dug, peanuts may contain from 35 to 50 percent moisture. This has to be reduced to 10 percent or less before the peanuts can be stored safely.

Peanuts can be dried either in the field or artificially. During recent years artificial drying methods have been improved, and artificial drying has been spreading rapidly—principally because of the saving of labor over natural

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FIGURE 4.—*Storage bins equipped with driers. Each pair of bins is serviced by one circulating fan heater (not in view). The heated air is blown up through the farmers' stock peanuts. The conveyer in front of the bins is on a turntable so it can be moved for loading and unloading any one of the bins.*

N 38704

FIGURE 5.—*Wagon driers with heating equipment for drying farmers' stock peanuts. Each of these wagons holds approximately four and one-half tons. A canvas hood fastens over the top of each wagon and air under controlled temperature is blown down through the peanuts. The bottom of the wagon is covered with heavy mesh screening to permit the forced air to escape.*

drying, which involves hand stacking. Artificial drying is now widely used in all production areas.

For artificial drying, the peanuts need only be cured in the field long enough so they can be handled by a combine-harvester. After the peanuts are dug, several rows are usually brought together into a single windrow using a side-delivery rake. After a short drying period, a combine can then move along the windrows picking the peanuts and discharging the vines on the field. (Fig. 3.)

While windrow drying does not require the labor involved in pole drying, peanuts cured or partially cured in windrows usually contain a higher proportion of trash, dirt, stones, and other foreign material than those cured on stack poles.

The peanuts are usually taken to a custom drier, where they are put in drying bins, with forced air circulated through them. Some peanuts are also dried in wagon driers. (Figs. 4 & 5.) Air temperature is usually maintained at 10–15 degrees above the outside temperature. For best results, a temperature below 95 degrees Fahrenheit is desired. Drying at higher temperatures can seriously damage the quality of the peanut kernels.

Despite the increase of mechanical drying, many people still consider stack drying in the fields the best method for producing high quality peanuts. (Fig. 6.) The stack is built up by placing the plants around the pole above cross pieces which serve as a foundation. Peanuts dry slowly in the stacks—usually 4–6 weeks—until their moisture content is down to 7 or 8 percent.

Stack drying has its disadvantages, however. It takes a great deal of hand labor to stack peanuts properly on poles, and this makes it expensive. Unless the stacking is carefully done, and the vines are well wilted before stacking, the peanuts may spoil in the stacks. Heavy vine running types, such as Virginias and the

N 38639

FIGURE 6.—*A field of peanuts in Virginia which have been stacked for drying. Peanuts are stack dried from four to six weeks before picking.*

N 38680

FIGURE 7.—*Unloading a truck of bulk peanuts at a sheller's plant required only a few minutes with this hydraulic dumper.*

Runners, are particularly subject to spoilage in hot weather if the vines are not thoroughly wilted. Even with proper stacking there is some danger from heavy rains and winds.

PICKING

After the peanuts are dried, the pods must be picked (i.e., removed) from the vines. Careless picking can cut the value of the peanuts by many dollars per ton. The three main goals in good picking are: (1) to recover the largest possible percentage of peanut pods from the vines; (2) to avoid breakage of the peanuts; (3) to remove the dirt, trash and other foreign material. The picking should be done in dry weather. If the atmosphere is too humid, the plants will be tough and the pods difficult to remove.

Windrow-dried peanuts are generally combined. Peanuts that have been stack-cured are usually picked with a stationary picker.

After picking, the current trend is to bulk load the farmers' stock peanuts directly into trucks, although some peanuts are still bagged at the picker or combine. The volume of the crop handled in bulk has been increasing so rapidly in recent years that many cleaners and shellers have installed equipment for mechanically dumping truckloads of bulk farmers' stock peanuts and conveyors to move the peanuts to their storages. (Fig. 7.) This permits inspection samples to be drawn automatically during the unloading and conveying operations.

STORAGE

Few growers store peanuts on the farm for any extended period. As soon as the peanuts are cured and picked, most farmers deliver their crops directly to shellers, warehousemen or buying brokers.

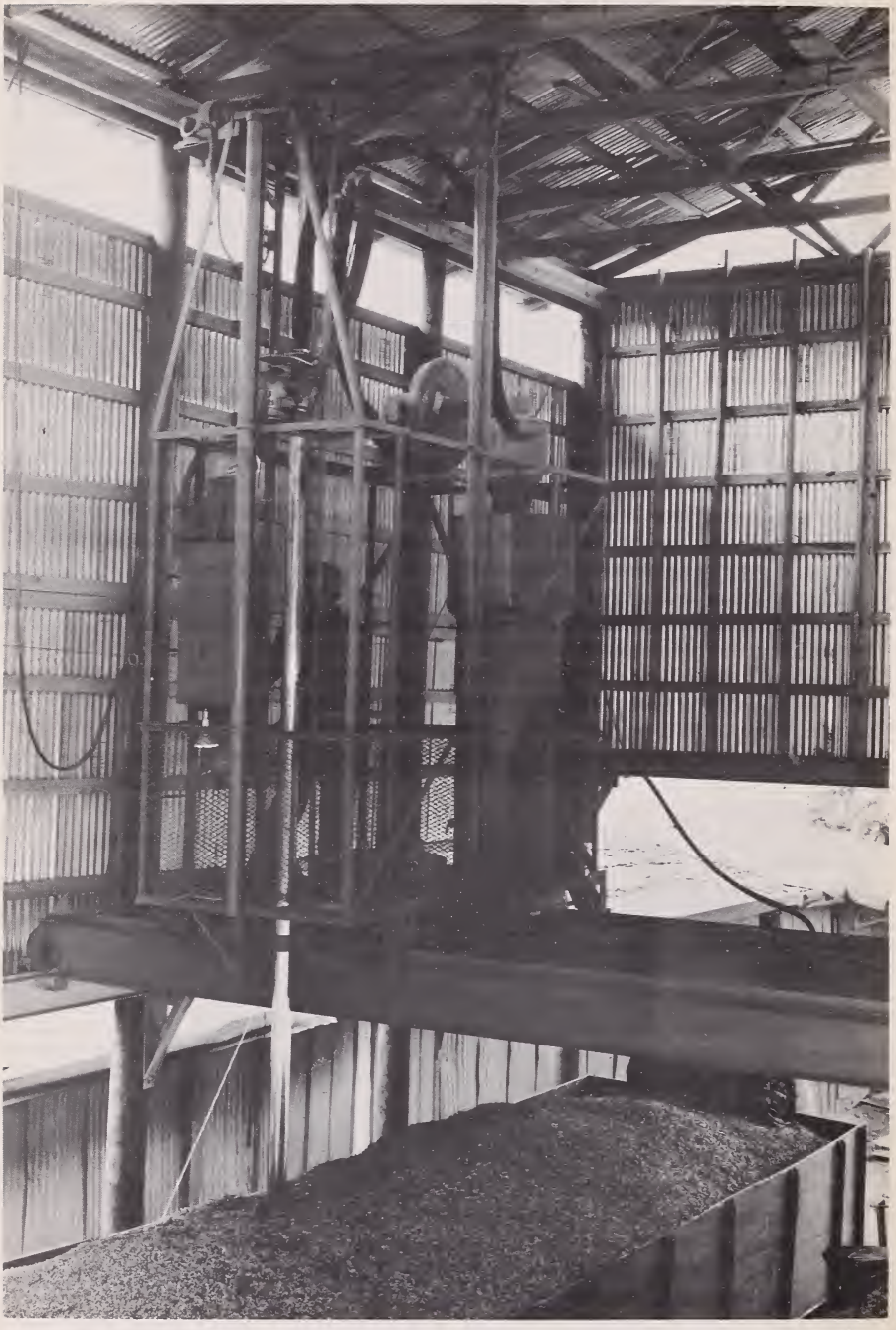

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FIGURE 8.—*Pneumatic sampler for drawing inspection samples of farmers' stock peanuts from trucks before they are unloaded at warehouses or shelling plants.*

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FIGURE 9.—*Spout type automatic sampler for drawing inspection samples of farmers' stock peanuts as the peanuts are being conveyed from the unloading pit to holding or storage bins.*

Customarily, settlement with farmers is based on grades determined by the Federal-State Inspection Service from samples drawn from the loads as they are received at the plant or warehouse.

On loads that meet specified minimum quality requirements, but are not purchased by a sheller or broker, the U.S. Department of Agriculture offers non-recourse loans as one means of supporting prices to growers.

The peanuts may be given a preliminary cleaning as they are placed in storage to remove stones, sticks and other foreign material. More often the cleaning isn't done until the peanuts are taken out of storage for shelling. Research has shown that treating the farmers' stock peanuts with an approved insecticide as they go into storage reduces losses from insect damage.

Farmers' stock peanuts are normally stored in common atmos-

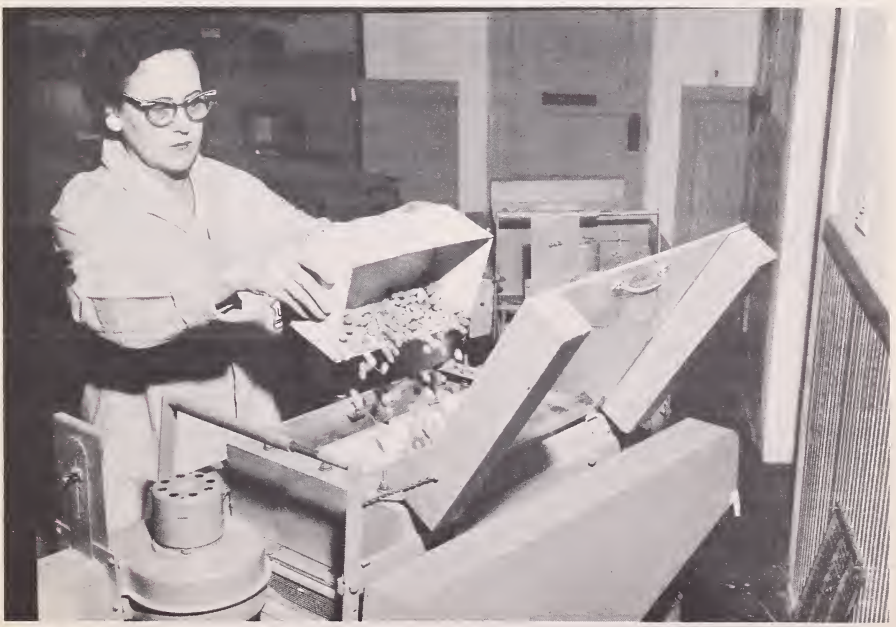

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FIGURE 10.—*Inspection aide dumping pre-sized sample of farmers' stock peanuts into mechanical sheller used by Federal-State Inspection Service.*

N 47309

FIGURE 11.—*Federal-State inspector examining sample of split peanut kernels coming out of mechanical splitter used by Federal-State Inspection Service as part of official grading procedure.*

pheric storages, built to allow some ventilation from outdoor air. These storages usually contain bins or sections for bulk peanuts, which may hold from 50 tons to thousands of tons. Many storages consist of groups of silos, which hold hundreds of tons each. Older storages are built with high roofs to permit stacking of bagged peanuts in 20 or more layers.

GRADING

Farmers' stock peanuts are graded by the Federal-State Inspection Service as a basis for payment to producers in accordance with the following factors:

1. Proportion of good-quality kernels, commonly referred to as sound mature kernels. This classification excludes undeveloped kernels that pass through a specified, small-sized screen opening.

2. Proportion of defective kernels, commonly called damaged kernels. Defective kernels include those riding the screen that are discolored, diseased, decayed, and insect-damaged.

3. Proportion of loose shelled kernels.

4. Amount of foreign material, or all substances other than peanuts in the shells or peanut kernels.

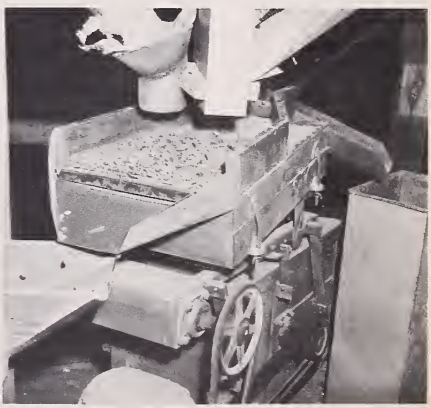
5. Moisture content.

6. As applies solely to Virginia-type peanuts:

   (a) Proportion of peanuts with large shells suitable for making "hand picks" which are sold for roasting in the shell.

   (b) Proportion of "extra large" sound kernels included in the sound mature kernels.

One of the most significant changes in the official grading of farmers' stock peanuts in recent years has been the development and adoption of a number of mechanical devices which have made it possible to grade a larger-sized and more representative sample, thus improving accuracy of results, and speeding up the entire operation. Among the types of mechanical equipment now approved for use by the Federal-State Inspection Service are auto-



N 38668

FIGURE 12.—*A shaker machine used to separate stones from farmers' stock peanuts. The stones are discharged into the containers at the right and the peanuts come off the chute at the left.*

N 38684

FIGURE 13.—*A stemming machine—Peanuts are passed through revolving serrated disks which cut off any stems not removed in the picking operation.*

matic samplers, sample dividers, pre-sizers, shellers, splitters, sizers, kernel counters, and moisture meters. Previously, these operations (except moisture determination) were performed by hand. This not only required a large amount of hand labor, but it seriously limited the size of sample that could be examined and graded within the time available. (Figs. 8 to 11.)

While several of the mechanical inspection devices are especially designed for use on farmers' stock peanuts, others, such as automatic sizers, splitters, dividers, counters, and moisture meters, also are used in the inspection and grading of shelled peanuts.

CLEANING AND SHELLING

All peanuts marketed are first cleaned, and—unless they're destined for roasting in the shell—are also shelled. Only about 7 percent of the peanuts that go to the edible market are roasted in the shell—usually Virginia or Valencia types.

Cleaning begins with a sand screen, to remove sand and dirt from the peanut pods. Then the stones, hay, and sticks are separated from the peanut pods by a vibrating and oscillating screen. (Fig. 12.) In addition, some cleaners are equipped with an air lift that removes the "pops", or empty hulls, and lightweight foreign material. Figure 13 shows a stemming machine used in the cleaning operations.

In-Shell Stock. Peanuts that are to be sold in-shell may still require further cleaning to insure a bright hull. In some cases this stock is "powdered" with a form of kaolin or talc. The pods and powder are tumbled together in a revolving drum. In most mills handling Virginia-type peanuts, the cleaned peanuts are run through large revolving perforated drums which serve as sizing screens. (Fig. 14.) The open-

N 38661

FIGURE 14.—*An end view of a revolving drum, with slotted screening which is used for separating out the "Jumbo" and "Fancy" peanuts to be sold in-shell. The smaller ones are shelled.*

ings in the screens are arranged by size so that the small pods drop through the first section of the drum. Those peanuts are used for shelling. The medium size peanuts drop through the openings in the next section of the drum and they are graded to make "Fancys." The large pods which come through the drum are graded to make "Jumbos."

Shelled Stock. Peanuts are shelled in a drum-shaped device with heavy, curved grates forming the lower half of the drum, and a revolving beater inside the drum which crushes the pods against the ridges in the grates. The clearance is sufficient to avoid injuring the peanut kernels when the shell is crushed. Peanuts and broken shells drop through the openings in the grates, and the shells are siphoned off by air suction.

After the peanuts are shelled, the kernels are passed over oscillating shaker screens and separators or through a "jitter bug" which removes foreign material, undersize kernels, unshelled peanuts and split kernels. (Fig. 15.)

The kernels then may go to a conveyor belt picking table where defective kernels and any remaining foreign material can be removed by hand, or the kernels may be passed through electric eye sorters which automatically remove defective kernels.

The sequences and number of cleaning, grading, and picking operations will vary from mill to mill. Most mills are also set up so that the sequence of operations can be adapted to the particular stock of peanuts that is being run.

Once the kernels are cleaned, they are sized, graded, and bagged for shipment to market. (Fig. 16.)

MARKETING SHELLED AND CLEANED PEANUTS

Shelled and cleaned peanuts are sold in several ways: (1) Through a broker either at shipping point or in a market center where the user is located; (2) direct to the user, such sales usually being in carlot or trucklot quantities; or (3) through a sheller's representative or commission merchant in one of the larger markets.

To take care of the needs of many firms which purchase only small quantities of peanuts at a time, brokers combine a number of less-than-carlot or trucklot orders from different firms into what is known as a "pool car" or "pool truck" shipment to get the buyer a more favorable freight rate.

PEANUT MARKET NEWS REPORTS

As a service to the peanut industry and its related trade, the Agricultural Marketing Service of the U.S. Department of Agriculture issues a weekly Peanut Market News Report containing current information on the marketing of peanuts and byproducts such as peanut meal and peanut

N 38656

FIGURE 15.—*An oscillating shaker screen separator removes foreign material from kernels. This machine is usually set up so that the stock can be run over it more than once if necessary.*

N 38671

FIGURE 16.—*The discharge spouts of a sizing machine. This is the final step before the shelled kernels are bagged.*

oil, as well as competitive oilseed meals. Shipping point market conditions, including comments on movement and price quotations by shellers and brokers, make up a major portion of the report. Prices on milled peanuts represent sales and quotations, by types, on a graded, per pound, f.o.b. shipping point basis. Farmers' stock peanut prices also are quoted during the harvesting season. During summer and fall months, a summary of growing and harvest conditions is carried.

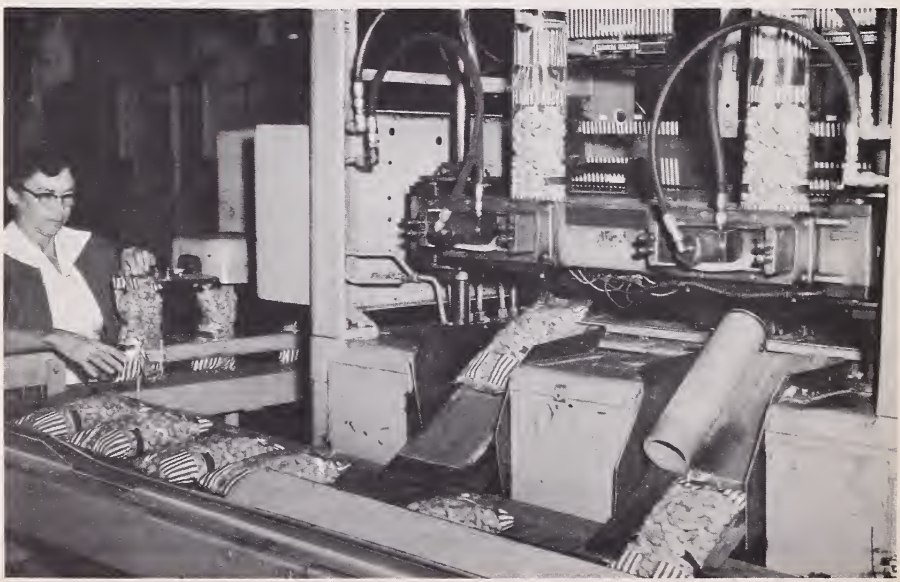
Market news reporters in 16 of the larger terminal market cities check current peanut prices and market conditions each week with the leading brokers and handlers in those cities. Prices as quoted by type and grade on less than carlot quantities are reported by wholesalers. Brokers' sales and quotations on either a delivered or f.o.b. basis also are listed. Receipts in each city are tabulated and reported each week.

The information for these reports, gathered by market news reporters in the various producing marketing areas throughout the country, is compiled and released in Washington.

A table showing quantities of farmers' stock peanuts graded by the Federal-State Inspection Service is carried in the report each week during the harvesting season. This table provides a good indication of harvest progress in each State. It also shows the quantities of peanuts that have moved into commercial channels and those that have been placed under government loan.

Foreign Agricultural Service reports covering the production and world trade in foreign grown peanuts are carried in the report occasionally. Releases by the Crop Reporting Board on current U.S. peanut crop conditions, yields, acreage and dispositions also are included.

Tabulations of peanut imports and exports obtained from the U.S. Bureau of Census are published in the Peanut Market News Reports. Such figures are listed



N 38736

FIGURE 17.—*Automatic machine for weighing and packaging in-shell peanuts in cellophane packs.*

N 41314

FIGURE 18.—*Roasted Runner peanuts being dumped from roaster into cooling trays.*

by countries of origin or destination, port of entry or custom district through which the peanuts are imported or exported.

ROASTED IN-SHELL PEANUTS

Most roasted in-shell peanuts ("ball park peanuts") are Virginia or Valencia types. For the most part they are marketed in small packages at sporting events, country fairs and circuses. (Fig. 17).

Roasting time for in-shell peanuts varies with the degree of heat, the moisture content, the size of the cylinder, and the quantity to be roasted. In small roasters with a moderate temperature, it may take 45 minutes to an hour, but with the large commercial roasters operated at higher temperatures, roasting may take 20 minutes or less. Most of the larger automatically operated roasters are thermostatically controlled.

When the kernels have taken on a golden brown color, they're poured into a cooler box with a perforated false bottom through which a large volume of air is drawn.

The weight shrinkage of in-shell peanuts during roasting averages from 7 to 10 percent during most of the year, but may be as high as 15 percent early in the season.

BLANCHING

There are two basic methods for blanching shelled peanuts (removing the skins). The more common is dry roasting, and the other method is known as water blanching.

Dry Roast Blanching. Dry roast blanching is usually just one

N 38716

FIGURE 19.—*This machine cuts the skins longitudinally on individual kernels preparatory to water blanching.*

of the steps in the preparation of peanuts by end users, such as peanut butter manufacturers or salters.

The kernels are partially or fully dry roasted and then cooled to shrink the meats slightly. (Fig. 18.) This loosens the skins so they can be removed in a blanching machine. There are several styles of these machines, but they all employ a rubbing action produced either by a series of revolving fine hair brushes or ribbed rubber belting. The amount of roasting is determined by the product in which the blanched peanuts are to be used.

Water Blanching. Much of this type of blanching is done on a custom basis for confectioners, roasters, and salters.

The first step in the water blanching operation is to cut the skins of the individual kernels longitudinally. This is done by a specially designed machine which automatically handles the individual peanut kernels. (Fig. 19.) After the skins have been cut, the kernels are run through a hot water spray on a conveyor belt. This loosens the cut skins.

The kernels, moving on a nobbed conveyor belt, then pass under an oscillating canvas-covered pad which rubs off the skins. (Fig. 20.) The blanched nuts are run through a drier where they are exposed first to hot air, then to cooler, dry air. The air in these driers is fresh air, dehumidified and heated to 120 degrees F.

After blanching, the peanut kernels are run through electronic color sorters which throw out unblanched, partially blanched or defective kernels and foreign material. (Fig. 21.) The kernels then receive a final visual inspection, before passing under an electromagnet, which removes any pieces of metal that might have gotten into the peanuts.

Blanched peanuts are produced

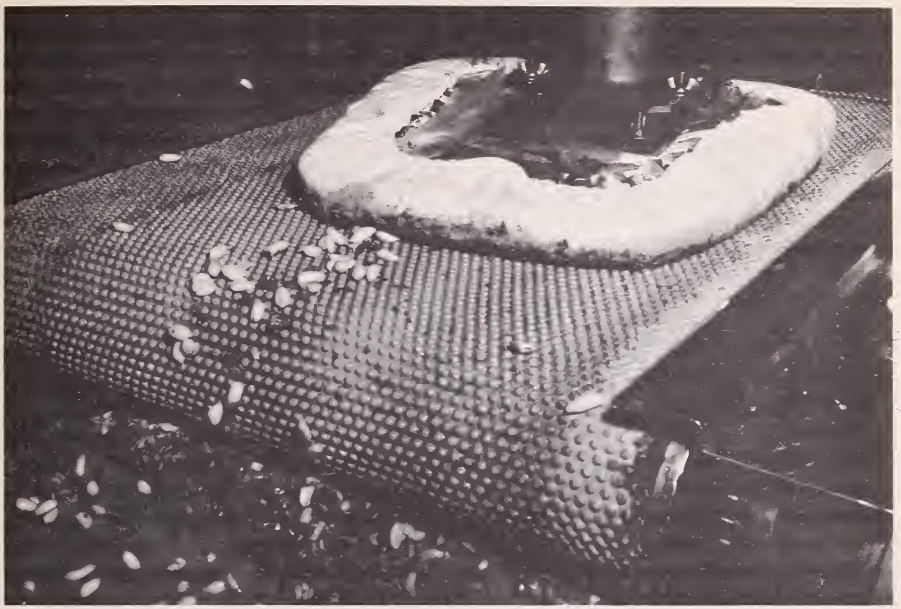


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FIGURE 20.—*After the peanut kernels have been water treated, this oscillating pad rubs off the skins.*

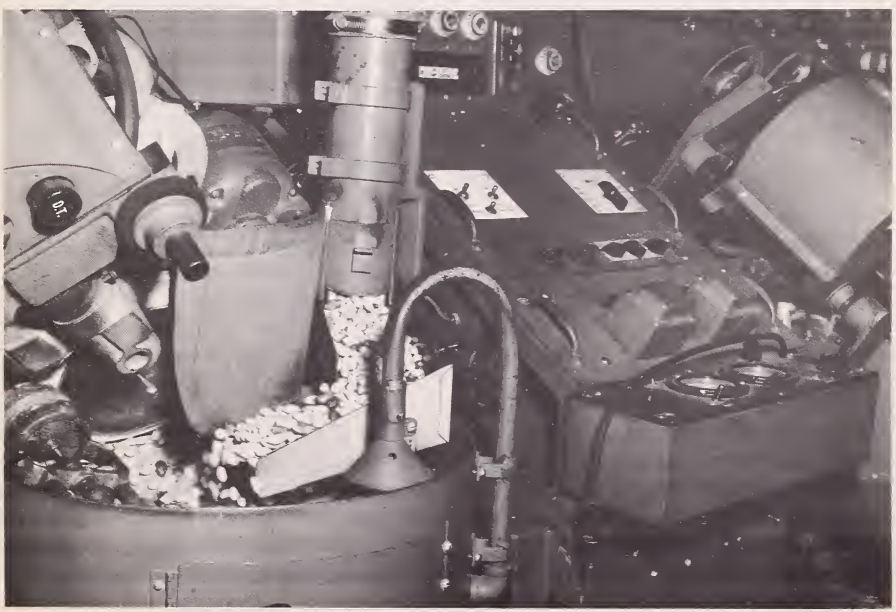

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FIGURE 21.—*This electric eye sorter automatically removes kernels which have not been blanched.*

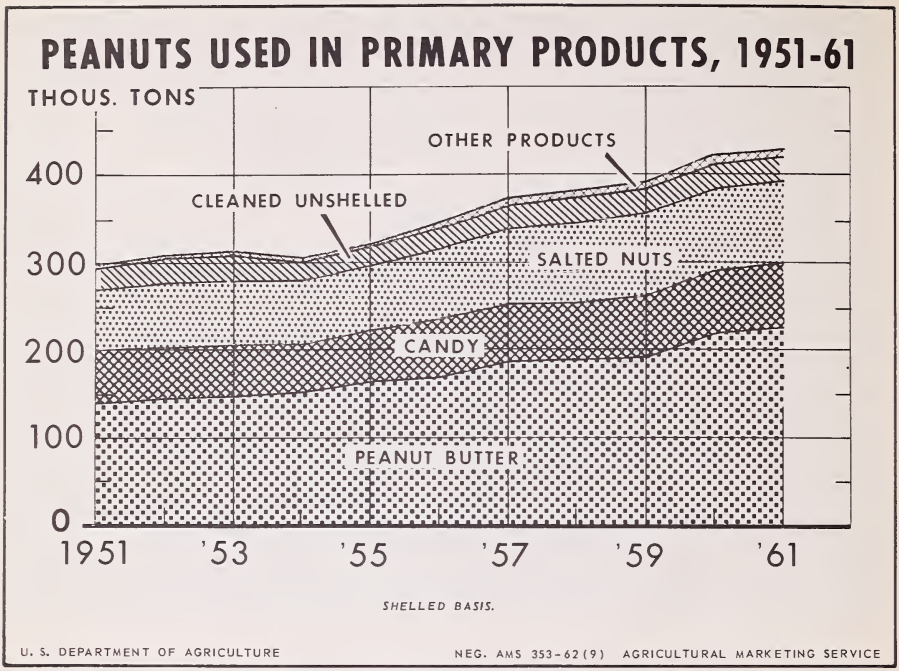

FIGURE 22.—*Chart—Peanut utilization totals.*

TABLE 2. *Quantities of Peanuts Used in Primary Products, 1951–61 Seasons*

[*Thousand tons, shelled basis*]

Season [1]	Peanut Butter	Candy	Salted Nuts	Other Products	Cleaned Unshelled	Total [2]
1951	137.9	60.4	70.3	3.3	26.9	298.8
1952	143.4	59.6	73.7	3.3	26.9	307.0
1953	148.8	59.5	74.6	3.4	25.4	311.6
1954	150.0	55.4	71.6	4.6	23.0	304.7
1955	162.8	59.3	73.2	4.8	20.8	320.9
1956	169.6	66.9	81.2	5.3	22.0	345.0
1957	186.5	68.5	85.5	6.6	25.0	372.1
1958	189.1	67.7	90.1	6.7	27.5	381.2
1959	191.9	70.6	95.1	6.8	28.2	392.6
1960	219.6	72.4	94.8	7.2	27.3	421.3
1961	225.0	74.4	93.8	8.2	27.7	429.2

[1] August–July.
[2] Totals do not always equal sum of uses because of rounding.

Source: Developed from data in USDA Peanut Stocks and Processing Report and records of Statistical Reporting Service.

as split nut or whole nut kernels. Split nut kernels are used mostly for peanut butter and candy bars, while whole nut kernels are used generally for salting and specialty items where a whole kernel is desirable.

PEANUT PRODUCTS

Peanuts are used in a wide variety of products, of which the most important are peanut butter, salted nuts, and peanut candy.

Table 2 shows that utilization of edible peanuts in primary products (other than crushing for oil) increased more than 40 percent from approximately 300,000 tons (shelled basis) in 1951 to 429,000 tons in 1961 (August-July season). (Fig. 22.) The greatest increase has been in use of peanuts for the manufacture of peanut butter. From about 140,000 tons in 1951 utilization has shown a 60 percent increase. Use of peanuts in salting increased during this same period about 30 percent, while their use in candy increased slightly more than 20 percent. Use of Virginia-type peanuts in cleaned unshelled form ("ball park peanuts") has remained relatively stable at about 27,000 tons (shelled basis) annually.

About half of the total edible peanuts used in primary products over the past 10 years, have gone into the manufacture of peanut butter, almost one-fourth have been used for salting and about one-sixth have been used in candy. Virginia-type sold in cleaned unshelled form have accounted for less than 10 percent of the total.

Most of the Runner and Spanish types of peanuts are used for peanut butter and most of the shelled Virginia-type for salting. Spanish peanuts are the most widely used type for candy manufacture. However, some of each type is utilized in all three outlets.

For example, roughly half the peanuts used in the manufacture of peanut butter in recent years have been Runner-type, about a third have been Spanish type, and the remainder Virginias. (Table 3, figure 23.) The proportions vary from year to year, depending upon the size of the crops and comparative prices of each type.

TABLE 3. *Runner, Spanish, and Virginia-type Peanuts used for Peanut Butter, 1951–61 Seasons*

Season [1]	Quantities used				Percent of total used			
	Runner type	Spanish type	Virginia type	Total	Runner type	Spanish type	Virginia type	Total
	Thousand tons	*Thousand tons*	*Thousand tons*	*Thousand tons*				
1951	67.1	46.3	24.5	137.9	48.6	33.6	17.8	100
1952	83.5	29.8	30.1	143.4	58.2	20.8	21.0	100
1953	76.1	47.8	24.9	148.8	51.1	32.1	16.8	100
1954	83.1	35.4	31.5	150.0	55.4	23.6	21.0	100
1955	76.8	68.2	17.8	162.8	47.2	41.9	10.9	100
1956	89.9	52.5	27.2	169.6	53.0	31.0	16.0	100
1957	82.9	55.1	48.5	186.5	44.5	29.5	26.0	100
1958	94.1	66.5	28.5	189.1	49.7	35.2	15.1	100
1959	90.0	71.7	30.2	191.9	46.9	37.4	15.7	100
1960	114.4	73.8	31.4	219.6	52.1	33.6	14.3	100
1961	124.1	77.9	23.0	225.0	55.2	34.6	10.2	100

[1] August–July.

Source: Developed from data in USDA Peanut Stocks and Processing reports and records of Statistical Reporting Service.

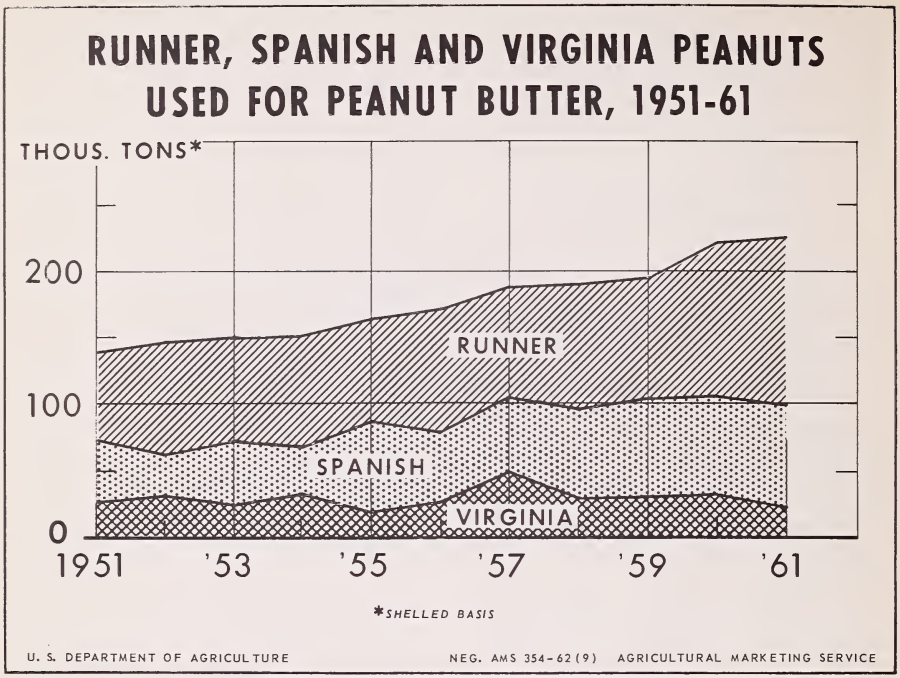

FIGURE 23.—*Chart—Peanuts used for peanut butter.*

For salting, Virginia-type peanuts are most widely used, accounting for about 70 percent of the total in this outlet during recent years. Spanish-type peanuts have accounted for most of the remainder, as only negligible quantities of Runners are used in this manner. (Table 4, fig. 24.)

TABLE 4. *Runner, Spanish, and Virginia-type Peanuts used for Salted Nuts—1951–61 Seasons*

Season [1]	Quantities used				Percent of total used			
	Runner type	Spanish type	Virginia type	Total	Runner type	Spanish type	Virginia type	Total
	Thousand tons	*Thousand tons*	*Thousand tons*	*Thousand tons*				
1951	1.4	18.1	50.8	70.3	2.0	25.8	72.2	100
1952	2.2	16.9	54.6	73.7	3.0	22.9	74.1	100
1953	2.4	17.5	54.7	74.6	3.2	23.5	73.3	100
1954	1.5	16.0	54.1	71.6	2.1	22.3	75.6	100
1955	3.9	19.0	50.3	73.2	5.3	26.0	68.7	100
1956	1.4	23.0	56.8	81.2	1.7	28.3	70.0	100
1957	.5	22.6	62.4	85.5	.6	26.4	73.0	100
1958	.3	25.3	64.5	90.1	.3	28.1	71.6	100
1959	.7	27.2	67.2	95.1	.7	28.6	70.7	100
1960	1.1	27.2	66.5	94.8	1.2	28.6	70.2	100
1961	1.1	25.9	66.8	93.8	1.2	27.6	71.2	100

[1] August–July.

Source: Developed from data in USDA Peanut Stocks and Processing reports and records of Statistical Reporting Service.

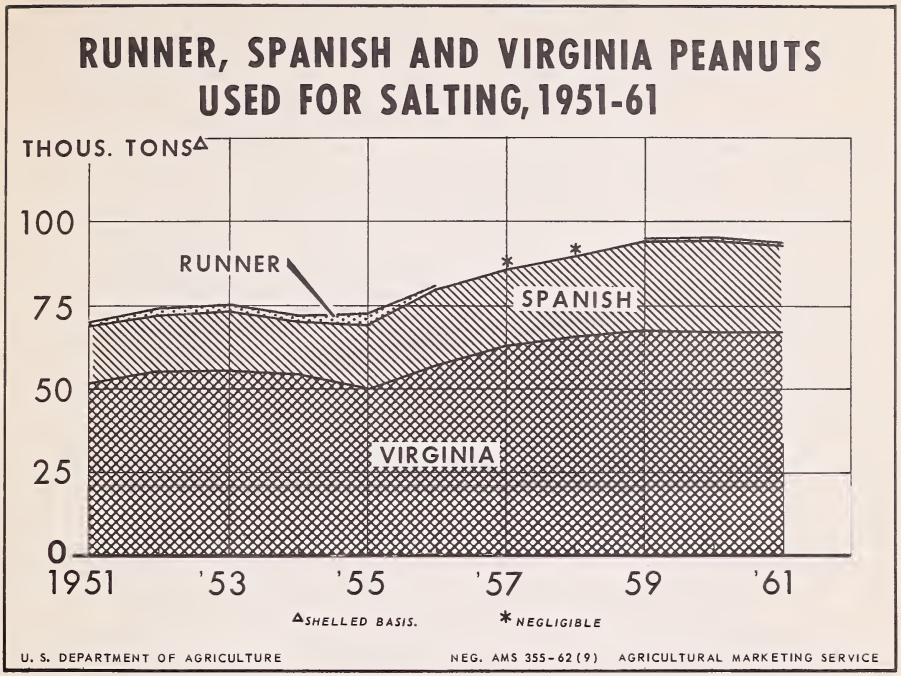

FIGURE 24.—*Chart—Peanuts used for salting.*

In the manufacture of candy, Spanish-type peanuts have accounted for slightly over 50 percent of the total, Virginias have made up roughly a third of the total, and Runners the balance. (Table 5, fig. 25.)

TABLE 5. *Runner, Spanish, and Virginia-type Peanuts used for Candy, 1951–61 Seasons*

Season [1]	Quantities used				Percent of total used			
	Runner type	Spanish type	Virginia type	Total	Runner type	Spanish type	Virginia type	Total
	Thousand tons	*Thousand tons*	*Thousand tons*	*Thousand tons*				
1951	8.3	34.2	17.9	60.4	13.8	56.6	29.6	100
1952	14.2	26.0	19.4	59.6	23.8	43.6	32.6	100
1953	8.8	31.6	19.1	59.5	14.8	53.0	32.2	100
1954	9.6	27.2	18.6	55.4	17.3	49.1	33.6	100
1955	9.4	31.6	18.3	59.3	15.8	53.4	30.8	100
1956	8.9	35.9	22.1	66.9	13.3	53.7	33.0	100
1957	6.9	39.0	22.6	68.5	10.1	56.9	33.0	100
1958	8.9	39.5	19.3	67.7	13.2	58.3	28.5	100
1959	8.7	39.9	22.0	70.6	12.3	56.5	31.2	100
1960	9.0	39.4	24.0	72.4	12.4	54.4	33.2	100
1961	12.5	39.8	22.1	74.4	16.8	53.5	29.7	100

[1] August–July.

Source: Developed from data in USDA Peanut Stocks and Processing reports and records of Statistical Reporting Service.

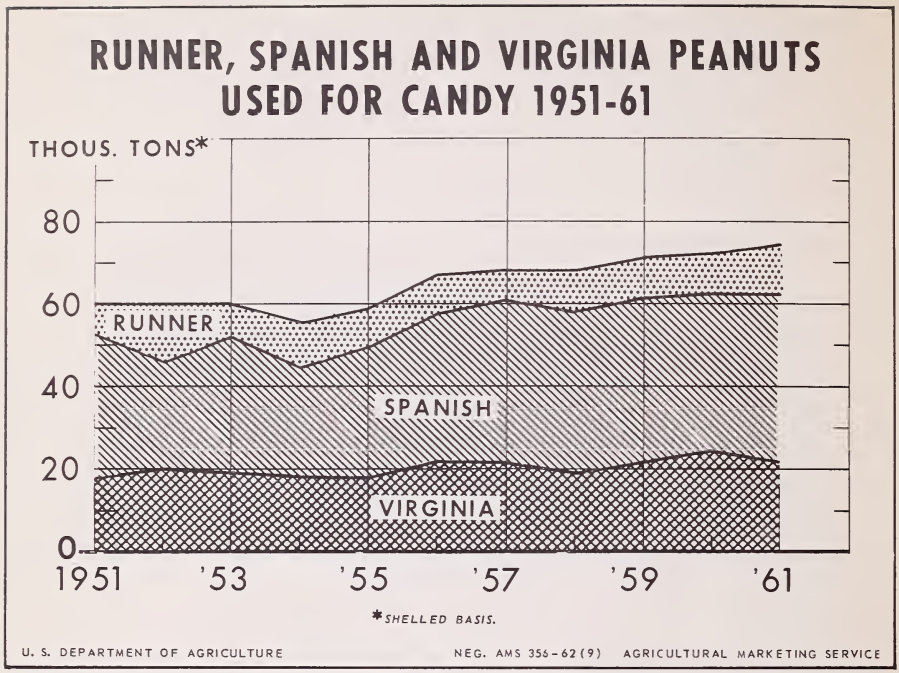

FIGURE 25.—*Chart—Peanuts used for candy.*

Peanut Butter

Peanut butter was first used in about 1890 as a food for invalids. There has been quite a change since then. Peanut butter is now considered a staple food item with more peanuts used in its manufacture than in any other peanut product. Large quantities of peanut butter are used in the commercial manufacture of sandwiches, candy, and bakery products, but its chief use is in the home.

Peanut butter is made by grinding roasted and blanched peanuts with 1 to 2 percent of salt. Most manufacturers also include a small quantity of sugar or dextrose in the butter to improve flavor, as well as stabilizers to prevent oil-separation. High grade peanut butter will retain its flavor for many months in hermetically sealed containers.

All three major types of peanuts are used in large quantities in the manufacture of peanut butter, but Runners lead in this respect. It is a fairly common practice to blend two types in peanut butter making, notably Spanish and Virginias.

The usual steps involved in the manufacture of peanut butter include:

(a) Roasting and cooling the peanuts
(b) Blanching
(c) Cleaning
(d) Blending
(e) Grinding
(f) Stabilizing
(g) Cooling the butter
(h) Packaging

(a) *Roasting and Cooling the Peanuts.*

Roasting determines to a great extent the flavor and color of the peanut butter. During roasting, considerable moisture is lost and the protecting skin is loosened. The kernels are handled as gently

as possible to avoid rubbing off the skins with consequent discoloration of the kernels.

The peanuts are roasted in cylindrical roasters. If the roaster is used exclusively for shelled peanuts, manufacturers prefer a cylinder with a very smooth interior surface, that can be rotated at low speed. The newer machinery can roast peanuts even at low temperatures in 9 to 15 minutes. The roasting temperature may range from 300 degrees to 350 degrees F. (Fig. 26.)

After the peanuts are roasted they are discharged into a cooler box with a perforated false bottom where a fan draws large volumes of air through the roasted peanuts. The roasted peanuts must be cooled rapidly to avoid further—and uneven—development of color which could lower the quality of the peanut butter.

(b) *Blanching.*

Blanching removes the skins and hearts (or germ). The skins are rubbed off and blown into a collector, the kernels are split, and the hearts are taken out. Some processors consider the hearts undesirable as they affect the flavor of the peanut butter. There are others who feel that the hearts have no adverse effect on the butter, and add them back. Particles of skin detract from the appearance of the butter.

The skins and hearts are sold for oil extraction, and the fine peanut particles or "meal" produced by the blanching process are sold for stock feed.

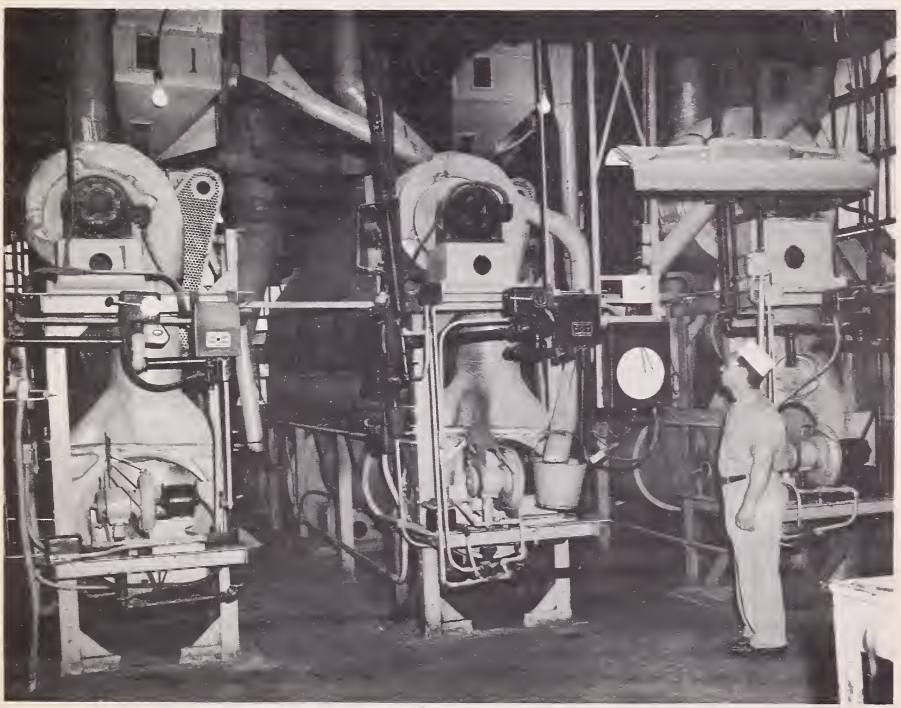

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FIGURE 26.—*A bank of continuous dry roasters. Peanuts are fed by gravity from bulk bins.*

(c) *Cleaning.*

Before the peanuts are ground into butter they are usually passed through a de-stoner or over a conveyor-belt picking table where any remaining foreign material, as well as burnt kernels and those with bits of skin still adhering are removed. In some cases, the nuts are run through electric eye sorters which remove foreign material and unblanched nuts before they are inspected visually. The loose, light material, such as bits of skin or chaff, is drawn off by suction as the peanuts pass along the belt. Most of these conveyor belts are also equipped with a powerful electromagnet for removing pieces of metal which could cause serious damage to the grinding mill and contaminate the finished butter.

(d) *Blending.*

If different varieties of peanuts are used for producing peanut butter, they are thoroughly mixed in the hopper just prior to the first grinding operation.

(e) *Grinding.*

Peanut butter manufacturers commonly use two grinding operations, known as "double-milling". The first mill reduces the nuts to a medium grind and the second to a fine, smooth-textured butter. During grinding the peanuts are fed into the mills under a constant, gentle pressure to assure a uniform texture in the finished product. The grinders consist of a heavy, revolving screw which forms the center of the mill body and which feeds a homogenous mass, under a uniform pressure, to a pair of adjustable ribbed grinding discs or burrs. In the grinding process the mills become heated and if the burrs are set to produce a fine-textured butter the mills are often water-cooled.

Originally peanut butter was produced by a one-step grinding operation. In this operation, stabilizers and other ingredients are added to the peanut kernels before the grinding. This method, while still in limited use, has been generally replaced by two-step grinding.

Some manufacturers pack a product known as "chunky" peanut butter. This product contains bits of coarsely ground or broken peanut kernels which are mixed with the finely ground butter. There are two ways to make this product. Several of the ribs of the grinding discs may be removed, thus allowing a certain proportion of small peanut chunks to slip into the mixture unground, or roasted peanuts may be broken into granular form about one-eighth the size of a whole kernel and a definite percentage stirred into the ground mixture just before it is run into the filling machine.

(f) *Stabilizing.*

The milling operation releases considerable free oil from the nuts, the amount of oil depending in part upon the fineness of the grind. After grinding, this oil tends to separate from the meal unless it is stabilized to retain the meal in suspension during the normal shelf life of the product. Today, stabilized peanut butter has largely displaced the "old fashioned", or unstabilized, type.

Stabilizers—hydrogeneated edible vegetable oils or glycerides—and other additives, such as salt and sweeteners, are commonly added to the butter during grinding. Some processors choose to add stabilizers and other ingredients immediately following the grinding operation. Generally, these other ingredients are free flowing and are metered into the mills at a uniform rate. A small amount of refined liquid peanut

oil also may be added with the dry ingredients to act as a "carrier" and distribute them uniformly throughout the butter. If hydrogenated oil is added during the grinding process, the mills must operate hot since the hydrogenated oil must be melted to get proper stabilization.

(g) *Cooling the Butter.*

Cooling is very important to proper stabilization. The peanut butter must be cooled rapidly from a milling temperature of about 170 degrees F. down to 120 degrees F. or less in order to crystallize the hydrogenated oil or other stabilizer and entrap the free oil. Rapid cooling is done with heat exchange equipment—a series of pipes surrounded by a refrigerant.

(h) *Packaging.*

Peanut butter for household use is usually packed in glass containers. For institutional use, a considerable amount is packed in tin containers.

Bulk peanut butter for bakers, candy manufacturers, or other large users is customarily shipped in friction-top tins, pails, or wooden casks, since it is generally used promptly. There is a limited demand for peanut butter in 450-pound steel drums.

The most popular filling machine is the piston-type, with positive-action operation. (Fig. 27). Some packers who do not have filling machines fill containers directly from the discharge spout of the grinder. The filled jars or cans are labeled, inspected, and put into cases for shipment.

Some processors hold the filled containers for 2 or 3 days at lowered temperatures to "temper" the butter and further protect stabilization. During this period the "set" is completed and the peanut butter can better withstand rough handling in distribution channels.

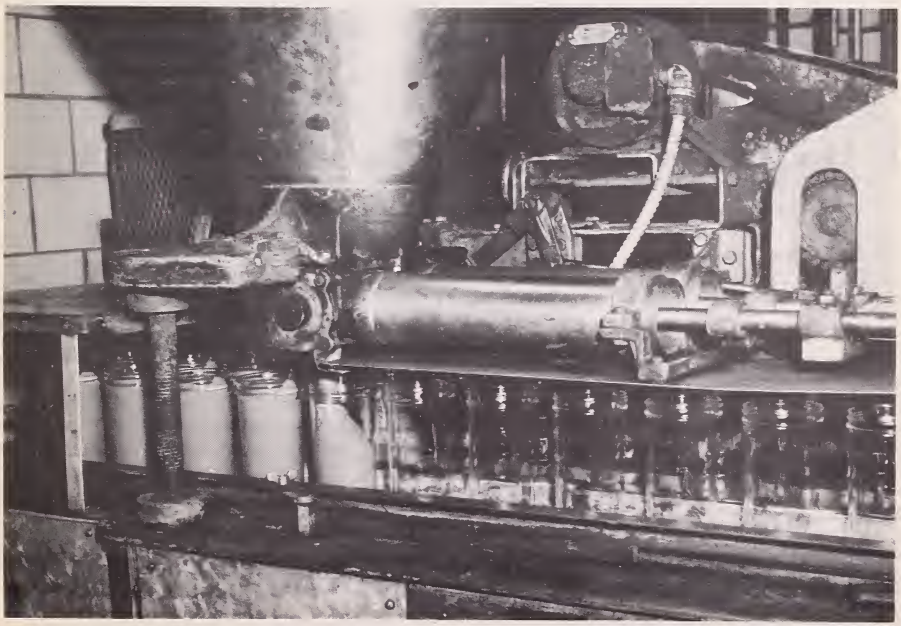

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FIGURE 27.—*Peanut butter being packed in two-pound graduated reusable glass jars. This is a piston-type filling machine.*

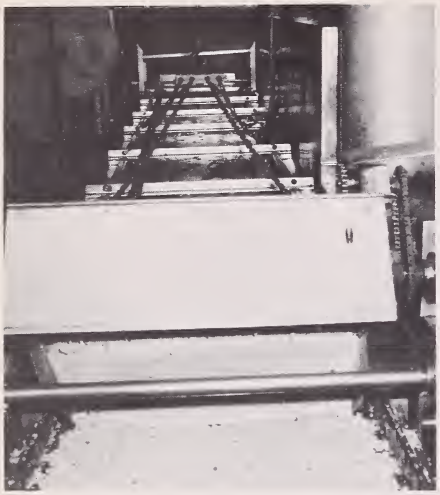

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FIGURE 28.—*Peanuts are oil roasted in a continuous cooker at 350 degrees F. for about 5 minutes.*

Salted Peanuts

Salting is the second largest outlet for shelled peanuts. The first step in a salting operation is to remove any remaining foreign material and defective kernels from the peanuts as they come from the shelling plant. Fans draw off lightweight foreign material, while a destoner may be used to remove stones and other heavy foreign material. The peanuts then pass to an electric eye sorter or a picking belt where defective kernels are removed.

Spanish peanuts are customarily oil roasted (deep fried) and salted without removing the thin, brown skins; other types are blanched before cooking. A cooking oil is selected which is least subject to rancidity, since it can be reused several times if kept filtered.

In continuous cookers only a small quantity of peanuts are fed into the oil at any one time, so the temperature of the oil stays uniformly high. The kernels are cooked in about five minutes. (Fig. 28.) Most continuous cookers are equipped with thermostats, for a uniform oil temperature and a more uniform roast. After the roasted kernels are discharged from the continuous cooker, the oil drains off as they continue along the processing line.

In the batch-type cooker, if the temperature of the oil is brought up to about 350 degrees F. before putting in any peanuts, it usually requires from 13 to 15 minutes to cook a 150-pound batch. When the nuts reach the proper color, they are promptly lifted out of the cooker, the oil is drained off, and they are then salted.

Salt is usually shaken over the roasted nuts with an automatic sieve and the peanuts are stirred or tumbled so the salt is evenly distributed.

Peanuts cooled before salting are often sprayed slightly with a vegetable oil, or occasionally with a glucose or gum arabic and water solution, so the salt will adher better. Some salters spray oil lightly on the peanuts after they have been salted.

Salting of Virginia-type peanuts began after the introduction of salted Spanish peanuts. In the earlier days of the industry, only the largest size Virginia-type peanuts were salted but later a demand developed for smaller sizes, such as "No. 1" and "Medium" Virginias, because they could be offered at a lower price.

Virginia-type peanuts for salting, unlike the salted Spanish-type, are blanched.

After blanching, the nuts may pass over an oscillating screen to separate the whole nuts from the halves and pieces, since the whole nuts command a higher price. The peanuts are then oil roasted and salted.

A recent development that apparently appeals to calorie-conscious consumers is the introduction of dry roast salted peanuts.

Because these nuts do not have the added oil which is picked up by the kernel during oil roasting, distributors have been promoting sales on the grounds that their calorie content is lower.

The packaging of salted nuts in transparent film is generally done by automatic machines which can handle a wide range of package sizes from a few ounces to several pounds. Most of the film packs contain less than one pound. The machines not only weigh out the desired quantity of peanuts; they also make up the bags, fill them, and seal them. Salted nuts are also packed in retail sizes of hermetically sealed cans. Salters pack a small quantity of salted peanuts in bulk for repackaging or for selling through vending machines.

Peanut Candy

Candy manufacturers in recent years have used over 70,000 tons of shelled peanuts annually, over half of them of the Spanish type.

The largest use of shelled peanuts in candy is in the manufacture of nut rolls. Other confections in which peanuts are used include chocolate bars, chocolate covered peanuts, peanut bars, and peanut brittle.

Most peanuts used in candies are given a light, dry roast and then blanched, although some candies use unblanched Spanish. The peanuts go through an electric eye sorter or over a picking belt for visual inspection, then through a light oil roast.

Chocolate-covered peanut bars, often called "nut rolls," usually consist of a nougat or a creamy caramel center covered with roasted blanched peanuts (usually Spanish type) and then coated with chocolate. (Fig. 29.) Some peanut bars, however, are marketed without any final chocolate coating.

Several sizes of bars are made to meet the various trade de-

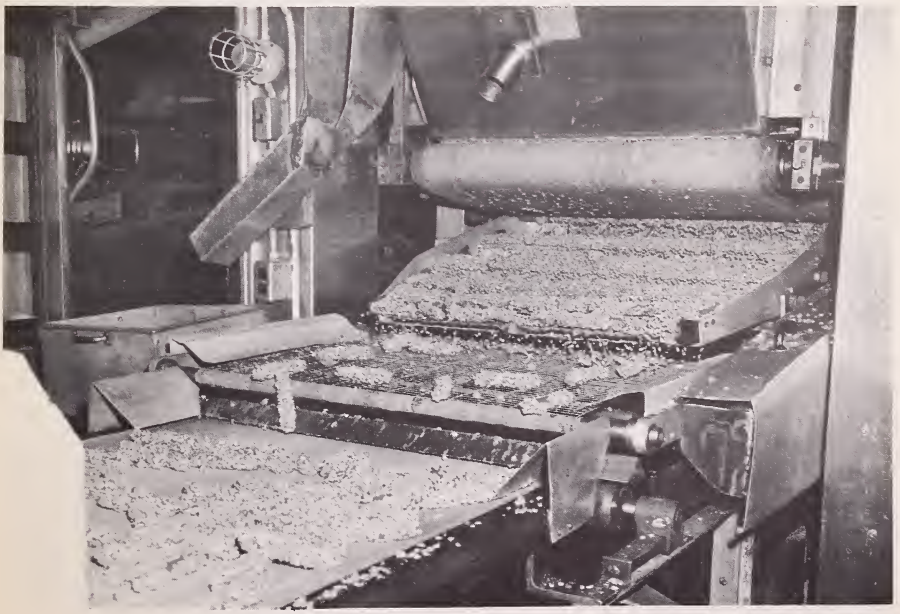

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FIGURE 29.—*Machine which enrobes the centers for chocolate "nut rolls" with hot caramel and then coats them with peanuts. The peanuts are being added from the hopper on the upper right of the picture.*

mands—from the miniature, which is usually sold in bulk polyethylene wrap, to the regular 5 and 10 cent sizes.

The manufacturers of assorted candies include chocolate coated peanuts with a caramel center, individual chocolate-coated peanuts, and chocolate-coated peanut clusters in the various packs of boxed chocolates retailed through confectionery stores, drug stores, grocery stores, and other outlets.

Peanut brittle is generally made with dry-roasted, unblanched Spanish peanuts. It is retailed in bulk, in boxes, and in hermetically sealed containers of one- or two-pound capacity.

A considerable volume of peanuts, broken into fine pieces called granules, is used in baked goods, confections, and topping for ice cream.

PEANUT OIL

Most peanut oil mills are equipped for both shelling and crushing peanuts for extracting oil. Most mills run them first through a shaker and a de-stoner to remove foreign material. After shelling, the loose hulls are removed by suction and the kernels may pass under an electro magnet which removes pieces of metal before the crushing operation.

The peanuts are chopped up and cooked before crushing to permit greater oil recovery. There are many types of steam cookers, but all have several stages for cooking.

From the cooker, the material goes to a screw press which resembles a large meat grinder. This is a continuous pressing operation discharging oil from one end of the machine and cake (oil meal) from the other.

The oil goes from the press to a screening tank where the larger particles of peanut kernel are removed before the oil is filtered through filter presses. The oil is then known as crude oil.

The cake which is discharged from the screw press may be used for stock feed without any further oil extraction or it may go to a flaking mill and then to a solvent extraction plant for removal of additional oil. (Fig 30.) The remaining cake may then be used for stock feed.

The crude oil must be refined before its final use. This operation removes suspended matter, free fatty acids, albumenoids, flavor, and coloring matter.

In the refining process, the crude peanut oil is treated with a solution of caustic soda (sodium hydroxide) which neutralizes the free fatty acids and precipitates much of the undesirable coloring matter. The alkali combines with the free fatty acids and with part of the oil to form a stock called "foots," which can be separated by high speed centrifuges.

The hot refined oil is mixed with a small quantity of bleaching clay and then run through a filter press. Since the oil still has considerable odor, it is then deodorized—heated under vacuum and blown by superheated steam. The resulting product is a bland, tasteless oil.

The chief use of peanut oil is in the manufacture of vegetable shortenings, cooking oil blends, oleomargarine, and salad oil blends. Highly refined peanut oil has a ready sale as a salad oil and also is used in frying and sautéing and as a shortening in pastries and breads. Peanut oil has such a high smoke point it can be used under higher heats than other cooking oils before it begins to scorch and smoke; hence, it allows foods to cook thoroughly and brown satisfactorily on the outside.

Some of the lower grades of peanut oil are used in the manufacture of soaps.

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